



ALGAE AS A BIOINDICATOR-TO STUDY ORGANIC WATER POLLUTION OF RIVER YERALA (VASGADE) DIST-SANGLI MAHARASHTRA (INDIA)

Suknada Kulkarni

Teacher, Department of Environment Education, Smt. Mathubai Garware Kanyamahavidyalaya, Sangli

ABSTRACT

Algae are one of the most rapid bioindicator of water quality due to their short lifespan, quick response to pollutants. Algal communities like diatoms and blue green algae effective bioindicators of organic pollution in the Yerala river. The study found that all sample sites had total scores exceeding more than 20, confirming significant organic pollution. Analysis of water parameters confirm that sampling site 2 highly polluted than site 1. The findings revealed that the river surface water quality was adversely impacted by agricultural runoff and domestic waste water.

The nutrient overload in the river Yerala causes the environment favourable for algae growth

KEYWORDS: Algae, Bioindicators, Yerala River Pollution Index, Nutrient Overload

INTRODUCTION

Algae are vital components of aquatic ecosystems which play a crucial role in maintaining the ecological balance of water bodies. They are widely recognized as bioindicator to study water quality because algae have short life span quick response to pollutants. The algae directly reflect quality in most water bodies (Alpetal2012)

The Yerala river in Vasagde Sangli district, Maharashtra (longitudinal and latitudinal 16.9710 74 5445°E are the coordinates of Vasagde) is an important water resource used for mainly agriculture and domestic needs and used by local flora and fauna. However agricultural runoff contributes to organic water pollution because the fertilizers and pesticides used in from nitrates, ammonia, phosphorous compound which when mixed with water causes nutritional overload leads to pollution that cause excess algae growth.

This excessive algal bloom can alter dissolved oxygen level and disturb aquatic life

Studying algal composition and presence and density in the Yerala river can give valuable insight into the extent of organic pollution as it shows adverse effect on aquatic ecosystem.

By monitoring algae, effective measures can be developed to mitigate pollution, conserve biodiversity, and restore the ecological health of the river. The water quality can be assessed based on algae used as bioindicator which is helpful to reduce pollution.

In present study Palmer (1969) Algal Genus Pollution index were employed to study water quality of river Yerala. Water pollution index is used for evaluation of water pollution. This study is helpful to use algae as a bioindicator for assessment

of water quality of River Yerala which is sub basin of river Krishna in village Vasgade district Sangli Maharashtra

MATERIAL AND METHODS

Sampling method was used for study. Algae samples were collected from the upstream and downstream of the Yerala River, which is subbasin of river Krishna

The regular monthly collection of algae was made from February 2024 to March 2024. Filamentous algal species collected with forceps. Diatoms collected by using tooth brush, macro algae picked up with hand by wearing gloves. The collected algal sample transferred into plastic bottles and were labelled as Site 1 Site 2. Upstream, downstream respectively

Preservation of algae

Macro algae were preserved in 4% formalin (Mason 1967) unicellular algae were preserved in 2 to 3 % formalin

Laboratory Studies and identification of algae

The microphotographs of algal species were taken with the camera attached with the microscope (MISOUM-Japan). Specimens of algal species were identified with the help of authentic literature (Smith 1950, Presscot 1962, Sarode and Kamat 1989)

RESULT AND DISCUSSION

In 1969 Palmer [6] made a significant attempt to identify and compile a list of algal genera and species tolerant to organic pollution

According to Palmer index score of 20 or more indicates high level of nutrient as organic pollution. The present study recorded pollution tolerant genera and species from algal groups at site 1 and site 2 in the river Yerala.

Agriculture runoff contain excess nutrients like nitrogen and phosphorus in to river which promot growth of alage like chorella seenedemuus oscillatoria which indicate river water polluted.

Genus	Pollution Index
Chlorella	3
Anxistrodesum.	2
Gomphonema	1
Oscillatoria	5
scenedesmus.	4
Closterium	1
Englena	5

Table 1: Algal genus pollution. Index (Palmere 1969)

Numerical values for pollution classification of Palmer (1969)

0-10: lack of organic pollution

10-15: moderate pollution

15-20: probable high organic pollution.

20 or more: Confirm high organic Pollution.

Algal Species	Pollution Index
Chlorella vulgaris	2
Euglena grucillis	2
Anxstrodesmusfulcatus.	3
Euglenaviridis	6
Gomphoemaparvulum	1
Oscillatorialimosa	4
scenedesmusquadracunda	4

Table 2: Algal Species pollution Index - (Palmer 1969)

Name of algal Genera	Group	Total Points	Site	
			Site 1	Site 2
Chlorella	G	105	+	+
Scenedemus	G	110	+	+
Pediastrum	G	38	+	+
Ulothrire	G	35	+	+
Acosmurium	G	16	+	+
Anxistrodesmun	G	16	+	+
Oscillatona	B	158	+	+
Spirogura	G	39	+	+
Euglenaacus	F	170	-	+
Gomphonema	D	47	+	+

Table 3: Pollution tolerant genera of alage from two site al river yerala vasgade, Sangli Maharashtra

G- Green alage D- Diatom B- Blue green alage

Key “+”= Present “-”= absent

Name of algal Genera	Total Points	Pollution Site	
		Site 1	Site 2
Scenedesmus	4	4	4
Quadracucula			

Chlarella Vulgaris	3	3	3
Oscillatoria	5	5	5
Gamphanema	1	1	1
Synedra	2	-	2
Oscillatariatenus	4	4	4
Anrcistrodesmus	3	3	4
Synedraulria	3	3	3
Total Score	20	26	

Table 4 : Species of alage from site I and II of river yerala Vasagde, Sangli Maharashtra

Thus overall-Pollution index shows that river water highly organic polluted.

Green alage like Tribunema and diatoms Tabellria also found in some amount.

CONCLUSION

The current study presents water quality deterioration due to agricultural runoff identifying nitrogen as significant contribute Alage sensitive to water pollution Alage from river shows dominance of chorella vulgaris, scendemus which are considered to be indicator of water pollution.

The pollution tolerant alage - can be used for remediation at domestic waste water.

REFERENCES

Palmer C.M Alage and water pollution castle house Publishers Ltel England (1980)

1. water supply and sanitary. engineering - Rangwala
2. Environmental pollution-M manivasanum
3. Environmental Problems Impact Assessment PR -Trivedi Gurdeep Raj
4. Environmental chemistry -B.K Sharma H.KAUR
5. Gerhartt A. Bioindicator species and there use in bio indicataring 1995.1:16:23
6. Hazzeman 1 Periphytic alage as bioindicator of river pollution in Sungai Patani kedan ‘M.sc.Dissertation University Malaysia 2008:127
7. Mahader J Hosamani SP Alage for biomonitoring of organic pollution in two lakes al my musore city National Environmental pollution technology 2005
8. Almedia SFP Use al diatoms. far fresh water quality evaluation in Potugak Linnetical 2001:2012 205-213
9. Pathak Neelam B and Mankodi P.C. Hydrological Status of Danteshwar pond Vadodara Gujurut India International Research Journal of environment Science., 2013. 2(1):43-98.
10. Churun Nilesh S.I * and Jawade Chetan S. Evaluation of the range of heavy metal concentration and its level of Accumulation in the fish sample of River Savitri at mahad - MIDC International Research Journal of environment science-2013: VO12CT- 69-75
11. J.S. Ambhore and * V.R Whankatt Biodiversity of marine alage along the Raigad coast al Kokan maharashtra European Journal al experimental Biology 2016:6(4):69-76
12. Hosmani S.P. and Bharati S.G. 1980, Alage as indicators of organic pollution phyros 19(1):23-26
13. Jose L. Sanju cine mathew and Srcekumar s. menon 2008 tudies on organic pollution based physical chemical and physiological characteristics of Some temple ends of arnakulam, kerala-India Nature Environmental and Pollution technology 7 (1):97-100

14. Tripathi Ak. Pandey, S.N. and Tiwari R.K 1987 Eutrophication Study of kalyanpur Pand India Proc. Nat Acad Sci. India, 57 (B)111
15. Trivedi A.K (1988). Ecology & pollution of indian rivers. Ashish publication house, New Dani
16. Randhawa ms-C1959) Zygnemaccae Indian couns of Agricultural research New Delhi
17. Rai V.N. Dubey, Shukla o.P. Dwivedi S & Tripathi R1D. (2008) Screening & identification of early Warning algal species for metal contramination in fresh water bodies polluted from point & non point sources Environmental monitoring Assesment 144: 409-981
18. Aquatic communities as indices of pollution in indicators of environmental quality Plenum press, N. Y. London
19. The Selection, testing and application of terrestrial insect as bioindicators Biol Rev, 73:181:201
20. Palmer cm (1960) Algae is water pollution Castle house Publication 2td England
21. Veenashree, kumar in Nandini <https://doi.org/10.55218/JASR.2022131007>